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FULL DETAILS AND TRANSCRIPT

District Perspective on Focused Curriculum

New Haven Public School District, Connecticut • June 2008

Topic: National Math Panel: Critical Foundations for Algebra
Practice: Mathematics Preparation for Algebra

Highlights

- Philosophy of preparing students for STEM careers
- Importance of fewer topics at deeper level
- Challenge of focusing on fewer topics when state assessment measures many different topics
- Development of 8 cross-grade units that cover major topics
- Vertical alignment of units with example of how addition would be addressed across levels
- Involvement of students in significant tasks that take multiple days and that promote conceptual understanding and fluency
- Importance of having students reflect on the “doing of mathematics”
- Benchmark testing 4-7 times per year
- Academic license for teachers to draw upon their own strengths for delivery of lessons

About the Site

New Haven Public School District

Worthington Hooker School

New Haven, CT

Demographics

45% White

25% Black

22% Asian

7% Hispanic

37% Free or Reduced-Price Lunch

11% English Language Learners

6% Special Education

The Worthington Hooker mathematics program exemplifies the goals of the New Haven School District in holding high expectations for all students, and preparing them for STEM career options. The school implements these features:

- Focus on fewer topics at deeper level of understanding,
- Cross-grade units with “significant tasks,”
- Benchmark testing four to seven times a year,
- Extensive focus on number sense and fractions,
- Roles for specialist teachers (physical education, music, visual arts) in providing additional math practice,
- Bi-monthly school level data team meetings, and
- Monthly coaches meetings at a district level to review results of school-level data team meetings.

Full Transcript

My name is Ken Mathews. I am the Math Supervisor for New Haven Public Schools. I administer the mathematics curriculum in 53 of our city schools. We service twenty-two thousand kids and approximately two thousand teachers. When the students in New Haven Public Schools are ready to enter the workforce, be it after high school or after college, 80% of jobs available to them will be STEM jobs—STEM meaning “Science, Technology, Engineering, and Mathematics.” In the United States, we have so many STEM jobs available that we are outsourcing those jobs or that we are recruiting workers from other countries. Meanwhile, because our students are poor and may not be achieving at the same levels as suburban counterparts, our students are denied access to these opportunities. It’s a deep philosophy of the New Haven Public Schools Math Department to prepare our students for careers in the STEM field.

After the Third International Mathematics and Science Study, it became apparent that countries who focus on fewer topics but with greater depth, produce students who perform much better than countries whose

curriculum is an inch deep and a mile wide; the focus is on a broad range of topics, but very little depth. Here in New Haven, Connecticut, we look at this research, we try to follow it, and we are developing a system where, in each grade, we do focus on fewer topics at a much deeper level.

In our state math assessments, there are approximately 125 strands or topics, that are measured. This is very broad, and if we were to focus solely on these topics, we would never be able to go very deep. The state assessment is a huge struggle for us, because there are an incredibly wide, vast array of questions that are being asked. However, we do have to soul search and say, “What is really best for kids? What are the universities saying that our kids need in order to be successful in careers in science, technology, engineering, and mathematics?” It all seems to come down to a deep level of algebraic concepts. So, it’s my goal that we do need to perhaps put aside the 125 strands of knowledge, that is being assessed on the state test and say, “Well, how do we vertically align our curriculum to get 8th graders ready to take a rigorous Algebra 1 course?” We looked at the state grade-level expectations and have developed them into eight units, which allows us opportunities to let students discover and explore and dig deep into eight units, that cover fewer topics, but we hope will end up with greater levels of mastery in the long run.

Our units are connected both across grade level and they are vertically aligned as well. So, for example, in first grade, a topic might be, a very deep topic may be, addition. They start with hands-on manipulatives. We try to use addition when we cover topics in probability, in statistics, in geometry, in measurement; so therefore, they are using addition in a wide variety of aspects—thus, gaining a deeper level of conceptual understanding.

We studied the work of David Squires, who is a curriculum specialist; and he showed that when students are engaged in deep multi-day problem-solving discovery activities, it allows them opportunities to make connections to big ideas and gain better conceptual understanding. So, within each of our units, we have two significant tasks, where students work in small groups over a few days to participate in a discovery project: For instance, balancing a checkbook could be one of them, buying a new car, carpeting a house; so, activities that really promote numeracy, competency and numeracy. All projects are scored using a rubric, and teachers have opportunities to explore and study student work after the significant tests are given.

We believe that if students can justify the reasonableness of their answers, if students can defend why they are proceeding in a certain way, then it allows them to reflect on the “doing” of the mathematics; so that they can, again when new topics come up, they can fall back on, “Okay, well, I use this certain procedure to get a solution here, this is just a little bit different, I can use a similar procedure and, therefore, come up with an answer.” So, it helps them to really understand their procedures and to understand why they are doing certain steps in order to get a solution as opposed to just blindly following a rote algorithm to get a solution.

In our curriculum, there are very well articulated, expected student outcomes, which basically illustrate

the behaviors that students should demonstrate in order to demonstrate mastery. We have benchmark assessments that measure whether or not our students are achieving the expected outcomes that we desire for them. So, depending on grade, we test between four and seven times per year districtwide, in all of our schools at the same time.

I think we do a pretty good job, in New Haven, at giving academic license to teachers. I think, just like there is a variety of ways in which students learn, there is a variety of ways in which teachers teach best, so we want to give teachers the freedom to draw upon their own strengths, interests, and desires and passions to deliver the lesson in the best way possible.